



CROSS SECTIONAL ANALYSIS OF GLUTEUS MEDIUS MUSCLES OF SCHOOL BOYS AGED 10 TO 17 FOR SHORTNESS/WEAKNESS.

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Abstract

Musculoskeletal conditions frequently show patterns of muscle imbalance. Some patterns are associated with handedness; some with habitually poor posture. Imbalance that affects body alignment is an important factor in many painful postural conditions; Muscle imbalance may result also from occupational or recreational activities in which there is persistent use of certain muscles without adequate exercise of opposing muscles. Examination to determine muscle length and strength is essential before prescribing therapeutic exercises because most of these exercises are designed to stretch short muscles or strengthen weak ones. Hence the purpose of the study was to cross-section analysis of Gluteus Medius muscles- Right and Left imbalance (shortness/weakness) among school boys in 10, 13, 15 and 17 year old boys. Muscular imbalances were observed in Gluteus Medius left and right muscle groups among school boys.

Keywords: *Muscular Imbalance, Gluteus Medius, Cross-Section Analysis, School Boys.*

Introduction

Posture is a position assumed by the body. The position may be either a static or a dynamic one. Static position are those in which the body is relatively inactive or immobile, such as when standing, sitting or lying Dynamic positions are those which involve movement such as in walking lifting , pushing or pulling . Good static and dynamic posture is important in order to have an attractive appearance to avoid interference with internal functions to prevent aches and strains and to maximize mechanical efficiency. In some cases, poor body alignment may be caused by structural or skeletal damage stemming from birth accident or disease (Vitale, 1973).

In the absence of structure defects, the skeletal frame is held in a balanced upright position by the equal contracting force of opposing muscle groups. For example contraction (shortening) of the muscles in the front of the neck pulls the head forward, while contraction of the muscles in the back of the neck pulls the head backward. In the normal resting state, each of these muscle groups is in a slight state of contraction known as tonic contraction. When each set of opposing muscles is equal in development and degree of tonic contraction. The head is held erect. Similarly, the shoulders are kept in alignment with the head by equal travels of tonic contraction in the chest and upper back muscles. The chest muscles exert force forward and downward, while the upper back muscles pull the shoulders upward and backward. Balanced tonic contraction of muscles which move the skeletal frame forward, backward, or laterally at the various joints its therefore essential for proper body alignment (Vitale, 1973).

Over a period of time, habitually poor body carriage or certain repeated movements in work or play activities that overwork one set of opposing muscles at the expense of the other – combined with a lack of properly balanced exercises – can lead to unbalanced muscle development and postural deviations. Basketball players often develop the same problem from the repeated contraction of the chest muscles in dribbling and passing and the corresponding stretching of the upper back muscles. Deviations caused by unbalanced muscle development may ultimately result in permanent structural deviations. Unfortunately, the gradual development of these postural deviations often goes unnoticed until they become serious enough to be obvious or cause functional disability (Vitale, 1973).

When one muscle is stronger than its opposing muscle, one has an imbalance. For instance, if one does push-ups or bench presses daily, but never do rows, pull-ups, or other upper body pulling movements, there is a good chance that one's chest is far stronger than the back, and likely have a strength imbalance.

So why is this issue? As far back as 1992, an article published in the journal Sports Medicine showed that an athlete is 2.6 times more likely to suffer an injury if an imbalance in hip flexibility of 15 percent or more existed.

And it is not just those who play sports who are at risk. "About 65 percent of injuries—both athletic and lifestyle-related—come from overuse, which is repetitive use of joints that are rendered dysfunctional by muscular imbalances," says Mark Verstegen, president and founder of Athletes' Performance and Core Performance (<http://www.athletesperformance.com>)



The opposing muscles and muscle groups are supposed to work together (Steven, 2011). Those muscles must be balanced in terms of strength, flexibility, and even posture to be efficient and to prevent injuries. Here are some examples of muscle pairs and the movements they enable:

- Biceps and triceps help bend and straighten the elbows.
- Deltoids and latissimus dorsi lift and lower the arms.
- Abdominals and erector spinae bend the spine forward and backward.
- Quadriceps and hamstrings bend and straighten the knee.
- Hip abductors and adductors move the legs toward each other or apart.

For non-athletes, a simple daily activity such as picking up groceries, working at a computer, sitting in one position for a long time, or lifting a child can cause muscle imbalance over a period of time. But for athletes, muscle imbalance is likely to be an overuse issue as a result of a particular motion used in their respective sports. Weight lifters often develop the pectorals (chest muscles), while neglecting the muscles in the upper back (trapezius) (Rupp & hopf, 1995; Kolber, Cheng & Hellman, 2009).

Pitchers in baseball often develop one arm and one side of the side without giving equal attention to the opposite arm/side (Ellen, Victoria, Emily, 1987: Pappas, McCarthy 1985).

In tennis, there is a condition informally called “gorilla arm,” which happens after years of doing almost every motion with the dominant arm to the detriment of the non-dominant arm (Klaus Bak & Peter Faunø, 1997).

Many conditions are caused by muscle imbalance. For instance, patellofemoral pain results from a band of muscle tissue that pulls the kneecap outward so that it grinds against the groove in which it lies. Runners’ knee (Niemuth, Johnson, Robert, Marcella & Thieman, 2005), jumpers’ knee, low back pain, and Achilles tendinitis are other common athletic injuries directly or indirectly caused by muscle imbalance (Cássio, Fábio, Maurício and Julia, 2002).

The simplest—perhaps too simple—way to avoid muscle imbalance is to choose exercises that strengthen opposing muscle groups, such as bench presses (for chest) and seated rows (for your back) (Janda, Vladimir, Clare and Craig, 1996). Basically correcting deviations stemming from unbalanced muscular development involves exercises based on the simple principle of “Stretch the short side and strengthen the long side” (Vitale, 1973).

A cross-sectional study is one that produces a snap shot of population at a particular point in time. More typically in education, cross sectional studies involve indirect measures of the nature and rate of changes in the physical and intellectual development of samples of children drawn from representative age levels. The single ‘snapshot’ of the cross-sectional study provides the researcher with data for either a retrospective or prospective enquiry (Cohen and Manion, 1980).

The main purpose of the study was to **cross sectional analysis of Gluteus Medius muscles- Right and Left of school boys aged 10 to 17 for shortness/weakness**. The secondary purpose of the study was to compare state, matriculation and central board school boys aged 10 to 17 years.

Methodology

Since the purpose of the study was to cross section analyses of the hamstring and quadriceps shortness and weakness of high school boys with age group of 10 to 17 years, it was decided to selected high school boys from standard six to plus two. Sixth standard boys formed the 10 year old, eighth standard school boys formed the 13 year old, tenth standard boys formed the 15 year old and the plus two boys formed the 17 year old group. For each age group 30 school boys were randomly selected from three different types of schools. For comparison purpose one state board school (Alagappa Model Higher Secondary School), one matriculation board school (Alagappa Matriculation Higher Secondary School and one central board school (Kendra Vidyalaya, CECRI) were used. Totally 360 students were utilized for the study. The experimental variables selected in the study were gluteus medius right and left. Fixed factor are: Type of schools, 1. State board, 2. Matriculation board, 3. Central board. The study was a descriptive and comparative study examining the dependent variables for shortness/weakness. The other factor under investigation was type of school (state, matriculation and central board). Data were collected on all dependent variables.

Tools:Data on all dependent variables were collected using Manual Muscle Testing procedure recommended by Kendall and Kendall, (1983). In testing gluteus medius right and left the subjects were asked to assume lying sideward position. Fixation



was done by the muscle of the trunk and the fixation by the examiner stabilized the pelvis. To test middle and posterior portion the abduction of the hip was done with slight extension and slight rotation. Pressure was given against the leg in the direction of abduction with slight flexion. With slight weakness of the gluteus medius, there will be postural deviation in standing. Comparison of scores were analyzed using SPSS 9.5 and the statistical analyzed was MANOVA. If the obtained 'F' ratio was significant, to find out the multiple comparisons LSD Post-Hoc test of significant test was used. To find out the statistical significance an alpha of 0.05 was used

Results

1. There was significant between 10 and 17, 13 and 17, 15 and 17 year old school boys on gluteus medius (right) muscle shortness/weakness.
2. Whereas there was insignificant difference between 10 and 13, 10 and 15, 13 and 15 year old school boys on gluteus medius(right) muscle shortness/weakness
3. There was significant difference between state and matriculation, state and central board school boy in the age group 17 school boys on gluteus medius (right) muscle shortness/weakness boys.
4. There was insignificant difference between matriculation and central board school boy in the age group 17 school boys on gluteus medius (right) muscle shortness/weakness boys
5. There was significant between 10 and 17, 13 and 17, 15 and 17 year old school boys on gluteus medius (left) muscle shortness/weakness.
6. Whereas there was insignificant difference between 10 and 17, 10 and 17, 13 and 17 year old school boys on gluteus medius (left) muscle shortness/weakness.
7. There was significant difference between state and matriculation, state and central board school boy in the age group 17 school boys on gluteus medius (left) muscle shortness/weakness boys.
8. There was insignificant difference between matriculation and central board school boy in the age group 17 school boys on gluteus medius (left) muscle shortness/weakness boys.

Conclusions

Muscular imbalance are noticed when child grow from age 10 to 17. These are serious implication for the future generation. Musculo-skeletal problems among young will lead to unfit nation. Hence it is recommended to incorporate remedial programmes even in young age.

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